REMARKS

Favorable reconsideration of the application is requested in view of the following remarks.

Claims 25-27 are canceled by this amendment because the subject matter thereof has been added to Claims 14, 20 and 21, respectively. Claims 16-18 are rewritten in independent form. Thus, Claims 14-24 are currently pending in this application with Claims 14, 16-18, 20 and 21 being independent.

The Official Action rejects Claims 14, 15 and 19-24 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,390,003, hereinafter *Yamaguchi*, in view of U.S. Patent No. 5,048,109, hereinafter *Bloomberg*.

The Examiner is thanked for indicating that Claims 16-18 define allowable subject matter. As those claims are generally rewritten in independent form they are allowable. The language in Claims 16-18 referring to "at least one of: conditions concerning the pixels at opposite vertices, conditions concerning pixels on outermost lines of said pixel-block area, and conditions concerning pixels on opposite sides on the outermost lines of said pixel-block area" has been changed to the equivalent, -- one or more of: conditions concerning the pixels at opposite vertices, conditions concerning pixels on outermost lines of said pixel-block area, **or** conditions concerning pixels on opposite sides on the outermost lines of said pixel-block area--. That amendment does not change the intended scope of the claims.

Claim 14 is amended to define in part that the partial-image recognition unit recognizes the partial image contained in said binary image data, for the pixel block area having the predetermined size and containing the target pixel in said binary image data, based on at least two of: the conditions concerning the pixels at the

opposite vertices, conditions concerning the pixels on the outermost lines of said

pixel-block area, and conditions concerning the pixels on the opposite sides on the

outermost lines of said pixel-block area.

Yamaguchi discloses a copying system for preventing copying copy-

prohibited images. Basically, Yamaguchi is concerned with persons making copies

of bills, checks, or notes (currency). To prevent such copying, Yamaguchi discloses

a device that detects marks on currency, and upon detection of such a mark, prints

"invalid" on the copy where the mark would otherwise be reproduced. As described

in columns 11 and 12 and shown in Fig. 10 of Yamaguchi, "[t]he image data sent to

the bill recognition processing section 67 is compared with the reference image data

in a pattern-matching portion (preliminary decision)" (column 11, lines 57-59). That

is, the peripheral circular outline of the pattern is first detected (column 11, lines 53-

54). "If it is decided at step S1009 that the former is not coincident with the latter, it

is decided that the original is not a bill" (column 11, lines 63-65). "However, if it is

decided at step S1009 that the former is coincident with the latter, there is a

possibility that the original document is a bill. Therefore, the main decision is made

(column 12, lines 3-6) and entails sequential comparison of the image data stored in

the bit map memory with each of the reference image data as shown in Fig. 10. That

is, there are a number of images (the same pattern at different angles of rotation)

that are compared with the scanned image. Yamaguchi does not provide any

description beyond generally stating that the image data is compared with the saved

images.

As recognized in the Official Action, Yamaguchi does not disclose at least a

partial-image recognition unit that recognizes a partial image contained in the binary

image data, for a pixel-block area having a predetermined size and containing a target pixel in the binary image data, based on at least one of the conditions concerning the pixels at the opposite vertices, the pixels on the outermost lines of the pixel-block area, and the pixels on the opposite sides on the outermost lines of the pixel-block area. For a disclosure of that subject matter *Bloomberg* is relied upon, and it is asserted that it would have been obvious to modify *Yamaguchi* to include all of that subject matter.

Bloomberg discloses a method and apparatus for detecting highlighted regions of a document. That is, a person highlights a document with a brightly colored marker, and those highlighted regions are detected and the text is extracted from therein. As described in the Background of *Bloomberg*, one of the problems with known detection and extraction processes relates to the imperfect application of highlighter onto a document, *i.e.*, incomplete coverage or over-coverage. The devices have difficulty detecting intended characters which are not fully highlighted and tend to detect some unintended characters that are partially highlighted. To address the issue of partially highlighted characters, *Bloomberg* discloses a device including morphological processes such as "Erosion," "Dilation," "Opening," and "Closing" to clean up and better detect the highlighted area. Basically, *Bloomberg* discloses cleaning up the image. Those processes of *Bloomberg* have nothing to do with image recognition, they are correction processes for enhancing images.

Claim 14 is allowable at least because *Bloomberg* does not disclose recognition based on any, never mind two, of the claimed conditions. In fact, *Bloomberg* is related to morphological processes, *e.g.*, Dilation and Reduction, which are used to clean the image data. See column 4, lines 20, 35, 41, 47, 51 and 53.

Also, column 8, lines 63-64 states that a small SE is used "to clean up any single or double pixel noise." An example of this idea is discussed in column 7, lines 34-38 where it is stated that "[r]eferring first to FIG. 2A, the HI is, optionally, reduced to SCALE=2 in step 10 using a threshold reduction operator with LEVEL=4, i.e., all 4 pixels must be ON in the original in order to produce an ON pixel in the reduced image." The references made to pixels in *Bloomberg* are not related to recognition of anything, but are rather references to pixels in an SE that are used to Dilate or Reduce, *i.e.*, clean an image.

Specifically, with regard to the first condition, *i.e.*, the conditions concerning pixels at opposite vertices, the Official Action points to column 12, lines 35-56, in *Bloomberg*. There, a hybrid process for establishing the highlighted area is discussed. Part "e" entails filling the highlighted regions into solid bounding boxes, and part "f" refers to the <u>identification</u> of the vertices <u>of the bounding boxes</u>. Basically, a box is established around the highlighted area and the vertices of that box are identified. The pixels at the vertices are points on the box surrounding the image and are not related to the image within the box. Thus, there is no disclosure of image <u>recognition</u> based on a condition concerning pixels at opposite vertices of a pixel block.

With regard to the second condition, the conditions concerning pixels on the outermost lines of the pixel-block area, the Official Action points to the disclosure in column 8, lines 39-57 in *Bloomberg*, that portion relating to production of an HR (highlighted region) and corresponding Erosion/Dilation of the image. That is, to produce an HR, the image of the highlighted region is Eroded/Dilated, among other treatments. Specifically, "the image is eroded in step 28 with a 1 x 4 SE. Thereafter,

in step 30 an ERODE is conducted using a 4 x 1 SE. In step 32 and 34,

respectively, a DILATE with a 1 x 4 SE and DILATE with a 4 x 1 SE are conducted.

The 4 x 4, 1 x 4, and 4 x 1 SEs are illustrated in Fig. 3." As pointed to in the Official

Action, column 8, lines 45-49 describes that "[t]he net effect of sequential ERODE by

a horizontal and then a vertical SE is the same as if the image were ERODED by the

outer product of the horizontal and vertical elements." That portion is relied upon for

a disclosure of the subject matter relating to outermost lines of a SE, but does not

relate to recognition. Rather, the SE is used to Erode and Dilate the image, thereby

cleaning the image. There is no disclosure of image recognition based on conditions

of the pixels on the outermost lines of a pixel block.

With regard to the third condition, relating to the conditions concerning pixels

on opposite sides on the outermost lines of the pixel-block area, the Official Action

points to column 12, lines 35-36 in *Bloomberg*. However, that portion of *Bloomberg*

recites "OPEN the image using a 3 x 3 SE to remove most of the ON pixels that are

outside the highlighted regions" and has nothing to do with recognition based on

conditions of a pixel. That is, as stated in column 4, lines 47-50 in *Bloomberg*,

Opening "is a morphological operation that consists of an erosion followed by a

dilation. The result is to replicate the SE in the destination image for each match in

the source image." Basically, the original image is merely reduced to ¼ the original

size. There is no disclosure of image recognition based on conditions of the pixels

on the outermost lines of a pixel block.

For at least the reasons stated above, it is clear that, though *Bloomberg* refers

to pixels in SEs, the pixels are not used for recognition and are rather used to

Dilate/Erode the image, thereby cleaning and morphing the image. Therefore, Claim

14 is allowable at least because *Bloomberg* does not disclose the claimed subject matter relating to <u>recognition</u> based on conditions of pixels at certain locations in a pixel box.

Claims 20 and 21 are allowable for reasons similar to those for Claim 14 with regard to similar language.

Claims 15, 19 and 22-24 are allowable at least by virtue of their dependence from allowable independent claims.

For at least the reasons stated above, it is requested that this application be allowed.

Should any questions arise in connection with this application, or should the examiner feel that a teleconference would be helpful in resolving any remaining issues pertaining to this application, the undersigned respectfully requests that he be contacted at the number indicated below.

Respectfully submitted,

BUCHANAN INGERSOLL PC
(INCLUDING ATTORNEYS FROM BURNS DOANE SWECKER & MATHIS)

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